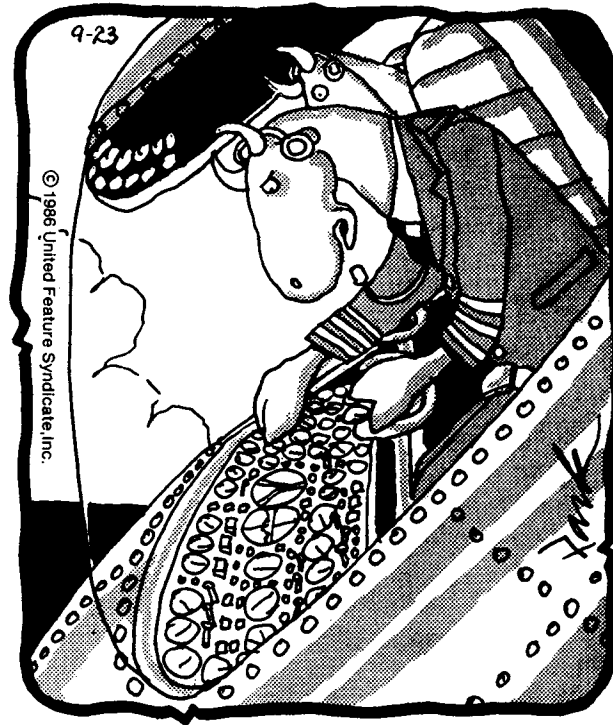


# Input and Output Devices

[Preece Chap 11-12; Hix Chap 3]

## Input devices



*'Darn these hooves! I hit the wrong switch again!  
Who designs these instrument panels, raccoons?'*

Clearly, we have to find a way to map devices, to interaction techniques, to tasks as part of any interface. Don't make the mistake of confusing an interaction device from and interaction technique.

- interaction device: A piece of hardware. It is the thing that collects data in some form from the user and passes it to the computer for processing. Example: a mouse
- interaction technique: Usually something you do with an interaction device. It more closely matches the intent of the user to some task. It allows a single device to be used for a multitude of tasks. Example: double-click, pull-down menu, scrollbar.

A discrete entry device is one that inputs information to the computer in a discrete form. Example: a keyboard. Each key is input separately from others.

A continuous entry device is one where data is streamed to an application. Example: a mouse. Each x,y pair is sent to the OS or application in a stream for processing.

The trick here is to decide what device is best for what task.

What is the functional difference between these pointing devices?



Mouse



Trackball



Joystick



Tablet

What is the functional difference between these keyboards?

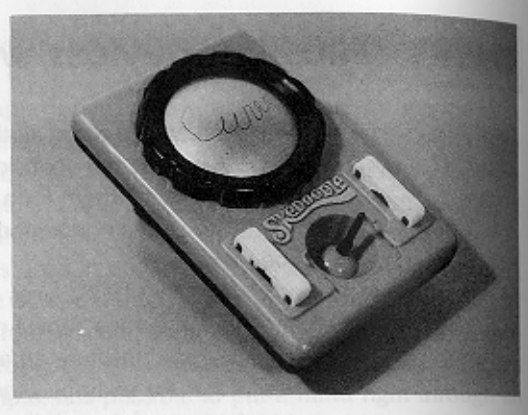
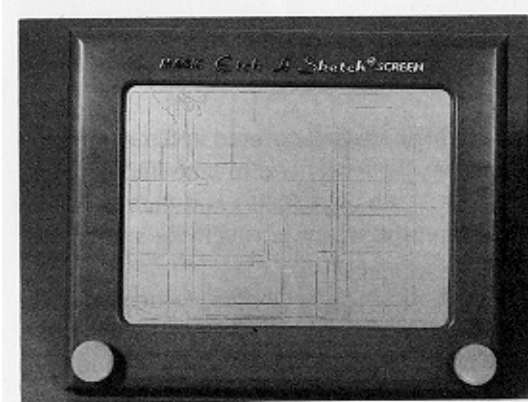


A Chord Keyboard



Standard Keyboard

Matching devices to tasks



The Etch-A-Sketch is best for tasks requiring straight lines and right angles. The Magna-Doodle is best for free-style writing that is not constrained in this manner. Each is well-suited for a certain category of tasks. Neither is a “better” device than the other. Also note that the Etch-A-Sketch is a two-handed device while the Magna-Doodle is a one handed device.

## Innovative input devices

### Handwriting recognition

Doonesbury

BY GARRY TRUDEAU



### Speech recognition

- Single utterance
- Connected speech

This is not the same thing as a “natural language interface”. In order to use natural language, you need to have (1) a connected speech recognition system, and (2) a natural language parser to figure out the semantics of what was said. This is a very complex problem.

### Output devices

Typical output is limited to the visual channel with full-color high-fidelity graphics. But there is usually some form of aural feedback as well. Few applications do not make use of at least a single error alarm to indicate an inappropriate input or warning message. But few use anything more. The aural channel is typically underutilized.